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Development of a Dispersed
Campsite Inventory Form
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DEVELOPMENT OF A DISPERSED
CAMPSITE INVENTORY FORM

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EXECUTIVE SUMMARY

Title: Development Of A Dispersed Campsite Inventory Form

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Summary: Intent of this project was to review what was available for completing campsite inventories, and then adopt or develop an inventory form for use at dispersed campsites. Outdoor recreation use is increasing every year. The developed campgrounds on the Summit District are filling up quicker each year during the heavy summer use season. More people are participating in dispersed camping activities, and some dispersed campsites or areas are becoming adversely impacted. With the limited funding available, dispersed camping seems to be ignored or placed on the back burner with the developed sites and wilderness areas receiving most of the attention of managers.

A literature search was requested of the Forest Service's Pacific Southwest Info Center for information about camping impacts, dispersed camping, wilderness camping impacts, etc. What seemed to generate the most response was an author search listing authors from a research paper that had been located on the District that dealt with wilderness campsite monitoring methods. As early materials arrived from the literature search, additional materials were requested from the new reference lists that would be helpful with this project. A literature search about recreation trends was also requested.

While waiting for the results of the literature request, the Stanislaus National Forest Land and Resource Management Plan was studied. The Plan discussed how recreation input was developed; about past, current, and projected recreational use and population increases on the Forest, and the demand versus supply for developed and dispersed recreational opportunities on the Forest for future years.

Forest specialists were consulted about water, soil, and wildlife concerns related to dispersed camping. From these discussions, recommendations were suggested to help control or mitigate dispersed camping impacts.

After all the literature review materials arrived, each report was read and studied to determine its applicability to this project. Most of the literature dealing with camping and impacts was wilderness related, but some of the material could be applied to dispersed camping.

After all the reading and discussions were finished, a form was developed for use in evaluating dispersed campsite areas. The form had to meet certain criteria to assure it would collect accurate and useful information. The form had to be user friendly and the individual campsite inventories could not take too much time to complete, or the form would not be useful. Remember, there is limited budget and personnel available to do these inventories.

The developed form needs to be field tested to determine if it collects the right data, is it accurate and precise enough, and can the form be completed in a timely manner. It was suggested by some of the research materials and specialists that all dispersed campsites in a pre-determined area be located on a map and inventoried. This will help to indicate where campsites are concentrated and help identify where management actions should be directed.

On the Summit District, there is funding to do a riparian initiative for one watershed during the summer of 1993. Part of this riparian project is to determine what resources are important to the watershed and if they are being adversely impacted. This form will be used to locate campsites and start the inventory of dispersed camping in the selected watershed. Other personnel will be trained in its use to help complete the inventories.

Dispersed camping needs to receive more attention before the recreational impacts are too severe for the resources to recover from. Attention to this recreational use will become more urgent as more people visit their National Forests to camp and find no developed campsites available. Use and pressures on dispersed camping areas will be increasing. This inventory form, or others like it, can be used to document the impacts from dispersed camping activities and perhaps help increase the awareness of and funding for dispersed (non-wilderness) camping.

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ABSTRACT

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Title: Development Of A Dispersed Campsite Inventory Form

Abstract: Recreational camping on National Forests is increasing yearly. Developed campgrounds are filling up sooner, sometimes before the weekend starts, and visitors are still traveling to the forests to camp. With the developed campgrounds full, sometimes the only option remaining for visitors that don't want to return home or travel somewhere else is dispersed camping. Dispersed camping activities are increasing each year, and associated recreational impacts to the resources are increasing. Campsites do not always have enough time to recover from the impacts, and these cumulative impacts are becoming increasing resource concerns. Limited funding and man-power does not always allow management the opportunity to address dispersed campsite problems. Posters and other informational materials are usually associated with wilderness or developed recreational camping, and these rules and camping practices are not always appropriate for dispersed campsites.

A method is needed to document the recreational camping impacts in dispersed areas. The documentation needs to be an accurate indicator of the existing impacts and be able to monitor changes in the impacts and campsite conditions over time. Developing the inventory form to evaluate and monitor campsites was a process of determining what was available for evaluating dispersed campsites, referencing the Stanislaus LMP for information and guidelines, and talking with Forest specialists in water, soils, and wildlife. Based on information from these sources, a form was developed that could be used to collect data from dispersed campsites that would provide meaningful information for evaluation and monitoring purposes.

Keywords: Dispersed Camping, Dispersed Camping Impacts, Campsite Evaluations

INTRODUCTION

This paper describes the process that was used to develop a non-wilderness dispersed campsite evaluation and inventory form for use in monitoring resource impacts. This form could be used to help document the resource impacts that are the result of dispersed camping activities. Although this form may not be suitable to use as is in other dispersed camping areas, with alterations it might be made suitable for use, or new forms might be developed using a similar process. Other areas may have different management emphasis and different dispersed camping impacts that require evaluation and monitoring methods different from those identified in this report.

Most of the communication media including television, radio, newspapers, and periodicals, reminds its readers that this country's population is increasing. The increase is more rapid than it has ever been in the past, and projections are that the population will continue to grow at an increasing rate of speed.

The demand for outdoor recreation is increasing along with the population increase. People have more leisure time available for recreation activities and have generally become more aware of the recreation opportunities closer to home in their National Forests. People have been told the National Forests belong to them and are available for their enjoyment. With this increased awareness of recreational opportunities is a new sensitivity to how the Forests are being managed and what impacts are occurring on National Forest lands. Most literature is in agreement that recreational demand will exceed the supply in the future. This is true for both public and private outdoor recreation opportunities. Some visitors to National Forests and some recreation personnel would argue that the current demand is exceeding existing supply now, especially during the summer weekend and holiday periods.

If the recent population and recreation projections prove valid (Stanislaus Land Management Plan, and Cordell and Hendee, 1982), visitors will be exceeding the developed recreation camping supply most of the time in the future. Many visitors will be seeking other camping opportunities either voluntarily or because of necessity when the developed campgrounds are full when they arrive.

National Forest developed campgrounds have facilities available to provide various levels of service and comfort for the visiting public. These amenities usually include a minimum of a toilet, rock fire ring, and perhaps a table. At the more developed end of the camping spectrum are campgrounds with piped and potable water, electrical hookups, water hookups, waste water dump stations, showers, flush toilets, picnic tables, and stoves. Between these

two extremes are numerous levels of amenities offered by developed campgrounds. These campgrounds usually have a well defined road system with designated camping spurs that may or may not be surfaced with pavement or rock. There are rules and regulations specific to developed camping, and encouraged campsite practices, posted on information boards. In California, if drinking water, a picnic table, and a fire ring or stove are available for public use in Forest Service campgrounds, then a fee can be charged. The amount of the fee usually reflects the level of development in the campground.

Each year developed campgrounds on the Summit Ranger District are filling up earlier, especially during the popular summer weekend and holiday periods. These campgrounds are sometimes full on Thursday evenings and visitors are still coming to the Forests to seek weekend camping opportunities. Some local campgrounds, on the more rustic end of the developed campground spectrum, are filling up on busy weekends. These same campgrounds used to receive very little use just a few years ago.

Wilderness camping is on the opposite end of the camping opportunity spectrum from developed camping. Opportunities available here are camping in primitive and pristine areas with no, or very limited, facilities. Hiking or backpacking, horse riding, or human-powered water craft are the usual means of access to these camping opportunities. Minimum impact camping practices, such as "Leave No Trace", are encouraged. The funding for wilderness management activities comes directly from Congress and is specified for use in wilderness areas. Brochures, maps, and posters have been developed with messages intended to educate and inform the public about acceptable camping practices in wilderness areas. There are several sampling techniques available for managers and field personnel to use in evaluating and monitoring recreational campsite impacts in these Wilderness areas.

Between developed and wilderness camping, are dispersed camping opportunities. This camping usually occurs where there is road access to areas suitable for camping. A high proportion of this camping takes place near water. Developed facilities are usually lacking except for rock fire rings and a miscellaneous table or bench. Some of the more heavily impacted and popular dispersed camping areas might have centrally located toilets, but this is usually the exception rather than the normal management practice. Funds that are available for dispersed camping come from Congress as part of a larger allocation for recreation management activities. Dispersed camping must compete with developed camping, interpretive services, recreation permittee administration and other disciplines for the limited recreation dollars. Priorities are usually higher in these other disciplines and dispersed camping usually gets little, if any, funding.

Many dispersed campers are participating in this activity by choice; they prefer this less crowded and quieter camping experience to the developed campgrounds which can be crowded and noisy. Some visitors to National Forests are not interested in backpacking and transporting their camping supplies on their backs into wilderness areas. Then there are visitors participating in dispersed camping because it is the last camping opportunity available after the developed campgrounds are full. Rather than travel home, or somewhere else, they decide to try dispersed roadside camping. This is especially true for visitors arriving late during summer weekends and holiday periods. Fees are not usually collected in dispersed camping areas, and some visitors prefer dispersed camping because they don't want to pay a fee to stay in developed campgrounds.

With increasing amounts and intensity of use, the dispersed campsites are becoming impacted by these recreational visits. These campsites do not always have recovery periods long enough between recreational visits to recover from the camping impacts. Research papers received from the literature search document that dispersed campsites are enlarging, soil compaction and erosion problems are increasing, and soil organic horizons are disappearing. Trees are becoming stressed and more susceptible to attacks by insects and disease. Toilet paper and trash is more evident on the ground and in the bushes. Tree mutilations are becoming more common. Streambank compaction and damage to streamside vegetation is an increasing concern to resource managers. When Forest Service personnel are aware of possible impacts to the resources that can result from dispersed camping, it can be frustrating to recommend dispersed areas to the visiting public as possible campsites.

Very few brochures, maps, or posters are available that can inform visitors about dispersed camping activities. There may be some locally created informational dispersed camping material, but usually posters and brochures are borrowed or adapted from developed and wilderness camping information materials. This adapted information is not always applicable to the camping impacts and resource concerns caused by dispersed camping, such as proper waste disposal and sanitation, protecting water sources and stream banks, limiting (voluntarily) campsite size, trampling of vegetation by vehicles and people, constructing numerous rock fire rings, new and expanding access paths and roads within camping areas, etc.

LITERATURE SEARCH

Much of the background information for this project was obtained from a literature search requested of the Forest Service Pacific Southwest Info Center. A description of the literature search needs included the following examples as possible keywords: dispersed camping, wilderness camping, limits of acceptable change, recreation impacts, campsite monitoring, visitor impacts on camping, campsite compaction, Recreation Opportunity Spectrum (ROS), and campsite inventories. The literature request included some of the references and authors mentioned in a wilderness campsite condition publication (Cole, 1989). Much of the literature review material was generated by the author search. After some of the earlier requested materials from the search were received, additional publications were requested of the Info Center using the reference lists in these new reports.

The majority of the information located was articles from journals and books. These articles were primarily about camping and campsite inventory methods for use in wilderness related areas. There were several articles that discussed recreational camping impacts to soils. One publication described a dispersed camping inventory system developed in the Pacific Northwest Region in the mid-1970's.

A summary of the literature articles that had information pertinent or helpful to the development of this project follows.

A paper was written (Cole, 1989) that described several steps considered necessary by the author in the development of a wilderness campsite inventory system. The paper had an appendix with several examples of forms and techniques being used in different locations of the country to inventory and monitor wilderness and park campsites impacts. The paper critiqued some of the methodology in use; discussing the strong and weak points of the various techniques.

The initial step suggested in Cole's paper was to evaluate the data needs and management constraints, then decide on what type of measurement system to use. It is vital that management decide what data needs to be collected and how to use the data after it has been collected. What impacts are important and need measuring? How much time, man-power, and dollars are available to complete the inventory? Can the system identify and monitor changes over time? The use of photographs is a good tool to enhance other field measurements, but used alone photographs may not be able to show the impacts occurring to the resources nor can photographs quantify impacts. The camera used to take the pictures, type of film used, time of day, season of year, lighting and camera location can influence what is captured or missed by photographs. Condition class surveys are a rapid estimation

method to gather impact information for campsites. Impacts are subjectively rated and assigned to a descriptive condition class. This technique is fairly accurate for measuring information about the relative impact levels for individual campsites, but monitoring impacts over time is difficult due to the lack of quantitative information on specific impacts. The best campsite impact evaluation and monitoring method for recording consistent changes to impacts over time is the establishment of permanent plots that can be re-measured. These surveys usually incorporate transects and subplots on the campsite. Information is measured and impact changes over time can be detected with re-measurements at a later date. The limitations of this technique are the large amounts of time and dollars needed to conduct the inventories and establish the plots. This technique can be cost prohibitive, but is a good supplement to use with surveys done by a more rapid measurement technique or when special data must be collected. Some rapid estimation techniques have been developed that measure and estimate resource impacts without permanent plots. Disturbed campsites are compared to nearby and similar undisturbed sites. Condition classes are used with several evaluation criteria that result in a cumulative impact rating, or an average condition class rating for the site. Weights of importance can be assigned to each of the evaluation criteria. This technique is quick and does provide accurate data that can be monitored some for measurable changes between condition classes over time.

After a decision has been made on which method to use for collecting data, the next step is determining how to measure impacts and select evaluation criteria. Impacts can be estimated by comparisons between disturbed and undisturbed sites, areal estimates, and direct measurements. To rate the impacts, ranges or descriptive narratives must be selected for the various impact levels. If the impacts are to be weighted by importance, these weights have to be assigned to the different impacts.

Step three involves testing the data collection technique on field sites. If problems develop, this is the time to make changes or corrections before investing time and funds to gather the field data. The results should be meaningful, consistent, and indicate the different severity levels of impacts over time and between sites.

The training of field personnel and the written instructions to complete the inventory form are very important for consistent measurements. Personnel change over time and plots may have varying time intervals between measurements. Personnel gathering the field data must understand the definitions and measurement techniques used. Written directions and periodic reviews of the data collection techniques can help the field work progress smoother and result in more accurate and meaningful information gathered.

The collected field data collected could be recorded on forms, data recorders, or mini-computers. Whatever recording method is selected, it needs to be clear and easy to understand. If the frustration level can be kept to a minimum in the field, more energy can be directed to the data collection efforts.

After the field inventories are complete, the analysis and display procedures need to be selected. Graphs, pie charts, tables, and maps can be used to display results. Good informational displays will assist managers to rank areas or sites for treatment and monitoring needs in some priority.

Finally, management has to decide how to use the data that has been collected and displayed. Do the worst sites get treated first, or will all sites located in one particular area be treated first. If there are identified standards that must be met, are they being exceeded and how will impacts to them be mitigated? These questions should have been considered during step one, deciding on needs and which impacts are critical to measure.

A master thesis was completed (Merigliano, 1987) that sought to identify environmental impacts a panel of natural resource related scientists considered most important to monitor in wilderness areas. A series of three questionnaires were mailed to this panel of scientists, researchers, and professionals located throughout the country. The purpose of the questionnaires was to create a consensus of agreement on which wilderness impact evaluation criteria were considered most important. The first questionnaire started with general questions, and each successive questionnaire built on the responses to the previous questionnaire. The first questionnaire had 135 panel members respond, and the last questionnaire had 84 respondents. The members were asked to identify and then rank indicators they considered most important to meet eight criteria (nine were in the first questionnaire, but one was dropped later). See appendix A for the nine criteria used to identify and evaluate indicators. The third questionnaire asked the panel members to judge how well the 32 indicators selected by the second questionnaire would perform for the eight criteria. In this manner, a consensus or compromise was reached on important indicators of wilderness condition impacts. Some of these are possible indicators for dispersed recreational camping. See appendix B & C for tables of vegetative and soil impact indicators selected by the scientists. There were other tables of impact indicators in the report, but these indicators were not easy to measure by field personnel without sophisticated equipment or they were indicators with little importance to dispersed camping.

Measuring Impacts of Wilderness Use (Parsons and MacLeod, 1980) explains the development of an inventory system to record visitor

impacts to back country or wilderness sites. The authors wanted a system that would not be time consuming, but feasible and provide quantifiable data. They observed that campsites are the primary focal point for visitors. The impacts to vegetation and soils around the campsite are good indicators of the amount of use. Other criteria such as number of fire rings, tree damage, wind breaks, tables and benches are important visual indications of impacts, but they can be altered significantly by a few number of visitors. An inventory was developed using five condition classes to rate eight evaluation criteria. The eight impact criteria they selected were total area of the campsite, development level at the campsite, density of vegetation, social trails, vegetation composition, barren core area at the site, tree mutilations, and litter and duff at site. All the criteria were weighted equally, so the ratings for each impact criteria can be summed and divided by eight for an average site condition rating. The field data and results can be analyzed and displayed to better document the findings, and provide information for defensible management activities. Appendix F has an example of a condition class inventory form with eight evaluation criteria rated by five condition classes.

The Limits of Acceptable Change (LAC) System for Wilderness Planning (Starkey et. al., 1985) was developed to provide resource managers with a process for establishing appropriate resource and social levels, or standards, of acceptable recreation use. This was a significant change from the practice of trying to determine an area's carrying capacity. The desired conditions are identified and then management actions selected to meet these standards. Public involvement is a must to guide managers on what people want from their resources. Existing conditions need to be known so managers can determine how to maintain current use or change use patterns to meet the desired condition. Monitoring and evaluations will indicate if management actions are succeeding. Appendix D has a graphic showing how the LAC nine step process is intended to work. If comparison of existing conditions indicate that the desired standards are close to being met or exceeded, management should prescribe actions to help return the resource and social conditions to acceptable levels.

One of the earliest papers the literature search located about wilderness campsite inventories and impacts (Frissell, 1978) was a condition class rating system. Frissell noted most human induced impacts in wilderness areas were noticeable at campsites. Detailed mapping and intensive measurements would not be practical for widely scattered sites in remote locations. This system has five narrative condition classes that a site can be assigned to. See appendix E for a chart showing the Frissell condition classes. Whichever class most resembles the site and impacts is the assigned rating. Frissell noted that a complete inventory of all sites in an affected area is needed with their locations and

ratings so that managers can make sound resource decisions based on the total picture. With each condition class, there are suggested management actions for possible consideration. This condition class system is fast to use and easy to teach to other personnel.

A dispersed camping inventory system (Hendee et.al., 1976) was developed and used in the Pacific Northwest. Again, like other studies, this research found most recreational activity centered around or near the campsite and this is where most recreational impacts were located. The sampling technique developed was named **Code-A-Site** and was based on observations and objective data collected from the field. Most non-wilderness dispersed camping is the result of road access into the Forests. **Code-A-Site** was intended to be used to collect baseline data on dispersed campsites and monitor changes over time. When first introduced, edge-punch computer cards were used to collect the field data which could be stored and retrieved later by needle sorting. See appendix G for a sample **Code-A-Site** card. The cards have extra room for managers to gather site specific data if necessary. Information collected was site descriptive about available resources and possible recreation activities, facilities present, and ecological impact observations. The back of the card had room for management notes, suggestions, and additional or more site specific data. Space for a schematic diagram was available to help with relocating the site. Personnel collecting the field data were encouraged to concentrate on the existing conditions and let the management decisions be made later.

A pilot study started on three Pacific Northwest Forests in 1975 and used the **Code-A-Site** inventory system. One significant finding of this study was the importance of water to dispersed campsite selection. Of all sites sampled, 85% were located adjacent to or very near water. Most sites were spacious and could accommodate several vehicles. Sites were concentrated along popular stretches of roads. The campers interviewed in the study did not seem to mind or notice the recreational impacts around them.

A report prepared for the American Forestry Association (Cordell and Hendee, 1982) identified some population and recreation trends. Water was identified as a focal point for outdoor recreation activities. The demand for all types of outdoor recreation is projected to increase faster than the supply. People's leisure time has been increasing over the years and people have been willing to spend more dollars on recreation. The supply is not projected to keep up with the increasing demand due to declining budgets, higher energy costs, and increased development costs. Following is a chart from the report showing projected increases in undeveloped camping:

<u>Projection Level</u>	<u>1977 (base year)</u>	<u>2030</u>
High	100	311
Medium	100	205
Low	100	155

In 1988, a report Use Patterns and Visitor Characteristics Attitudes and Preferences in Non Wilderness and Other Roadless Areas (Lucas, R.) was completed. Although prepared for wilderness areas, some of the information can be considered for dispersed camping. Wilderness managers need to know what their visitors expectations are. The better knowledge the managers have about visitors, the better recreational experience they can provide while protecting the resources. This study found that old camping habits are still in use which the public perceives as being the correct thing to do, but these habits are creating recreational impacts. The "pack-it-in, pack-it-out" message for unburnable garbage has not been received by all wilderness visitors. Many visitors were still burying their garbage in the wilderness and thought it was an acceptable practice. There could be other habits people are using that cause impacts. Examples include trenching soils around tents, tree blazing, clearing the ground for tents, and cutting tree branches for bedding. There is a need to get the proper and correct information out to the public. Signs, maps, brochures, and personal contacts are examples of methods to inform visitors. This report also highlighted the need for more dispersed recreation opportunities outside of wilderness areas that can emphasis recreation instead of ecosystem preservation.

A survey was completed of river recreationists (Marion and Lime, 1986) that documented the perceptions by visitors, recreating on rivers, to recreational impacts. Responses to the questionnarie were not significantly different when comparing eastern and western rivers. Deteriorating resource conditions were listed first and soil loss a distant second under normal wear and tear impacts. Litter, loss of recreational experience, and human waste deposits were the top three human-caused impacts listed. The paper noted that new visitors to a site or area might accept the resource impacts as normal, and they might not even recognize the impacts to the site. Returning visitors to a campsite or area might expect to find increasing impacts and consider them normal. It appears many recreational visitors are able to adapt to deteriorating campsite conditions and accept them as part of the natural process. It is important that resource managers do not become insensitive to camping impacts and decide not to manage them. Visitors and managers look at impacts differently; visitors are more emotional and divergent in their reactions and more sensitive and aware of human-caused impacts such as litter and human waste. The reaction to resource impacts is usually more

consistent by resource managers. Environmental impact assessment and monitoring methods are necessary to quantify the problem(s), locate where the impacts are distributed, indicate when a change has occurred in the condition of the resources, and help managers prescribe management actions to correct the identified problem(s). The publication's authors favored a rapid estimation condition class system to do campsite inventories. The paper ranked the impacts for measurement as follows: total campsite area, barren area at campsite, vegetation loss, tree damage, root exposure, number of access trails, cleanliness, and extent of campsite developments. This report also mentioned that some studies were being conducted to study the possibility of utilizing hand-held micro-computers to help collect the field data. Use of computers would eliminate the possibility of errors when transferring data from field forms to a computer for storage.

Another study (Marion and Cole, 1989), indicated there was little difference in the magnitude of impacts when eastern riparian forests were compared to western and northern Minnesota wilderness areas. The basic strategy for managing camping impacts between areas should be similar. The differences between areas is the detail needed for the different areas; selecting impacts to monitor, setting the limits of acceptable change, assigning condition class rating systems, determining evaluation criteria, and weighting the evaluation criteria. Inventory and monitoring systems should provide managers with quantitative data to document resource impacts, determine if conditions are improving or getting worse over time, indicate if management activities are effective, and set limits of acceptable change.

Recreation impacts to soils and their predictability (Marion and Merriam, 1983) was a study undertaken on 96 campsites in the Boundary Waters Canoe Area Wilderness (BWCWA). Each sampled campsite was paired with a nearby undisturbed area for comparison. The measured bulk densities, indicators of soil compaction, were 29% higher at the campsites than the undisturbed sites. Exposed mineral soil at the campsites was 10% greater than on the control sites. The rate at which new organic horizon was being created each year was not keeping pace with the rate of loss. To maintain the original organic horizons and decrease compaction impacts, recreational use will have to be limited or mulches added to the soils at the campsites. The amount of time required for resource recovery from impacts is much greater than the time needed for the impacts to occur, so rest and rotation periods have not been very effective management tools. In the BWCAW, managers have limited camping to approximately 2000 designated campsites to try and control camping impacts.

Campground trampling impacts and the ground cover responses was studied (LaPage, 1967) in a newly opened campground. Early results indicated an increased loss of ground cover that expanded

as the season progressed with increased use of the campsites. The initial species composition was replaced by more drought and trample resistant vegetation. At the end of the first season, the native vegetation was almost completely replaced by either barren areas or the more recreation resistant species. Sites with stationary picnic tables seemed to suffer greater vegetation losses.

In California, 137 campground and picnic areas were studied (Magill, 1963) to try and determine what site deteriorations were occurring. Over half the sites were without young seedlings or trees that would be able to replace the overstory trees. Nearly 30% of the trees on the sites were judged to be showing reduced vigor or poor growth. A majority of the trees had evidence of abuses by the recreating public. These abuses included tree roots being parked or driven on, nails in trees, trees with carvings, trees hit or scarred by vehicles, and trees cut down. Half the sites sampled had no shrub understory. Shrubs can be an effective barrier system to foot and vehicular traffic to mitigate compaction and trampling, and offer screening between campsites. Exposed roots, compacted soils, dusty sites, and erosion problems were identified at 70% of the sites.

The campgrounds in five California National Forests were studied (Magill, 1970) for recreational impacts to the vegetation and soil over a five year study period. Plots were established on nearby undisturbed sites near each campground. The results of this study indicated that some impacts to developed sites might not be as bad as once thought, and the impacts may not be always be the result of recreationists. Tree seedlings and saplings were having a difficult time in the campsites; suffering from trampling and compaction to the soils. In protected areas, where most trees were located, the young trees were doing good and benefiting from the lack of tree competition. Tree growth displayed no significant differences between disturbed and control plots. Shrubs seemed to be growing better in the campgrounds than on the control sites, possibly due to less competition between vegetation at the campsites for available resources. Exposed soil, often dusty, was common at the family campsites where people were concentrating their camping activities. This study recommended the testing and development of shrub species that could be grown in nurseries for planting in campgrounds to act as barriers and screening. Whitethorn, (*ceanothus cordulatus*), was an example of a species that could be used for this purpose. Evidence from the study indicated that campgrounds might be able to adjust to recreation impacts, and some of the impacts might be superficial. This was the only study that had these type of results. This study also emphasized the need to educate the public to not clear the ground of soils and organic horizons for tent pads, and to not trench the ground around tents for water drainage. These two

practices caused significant impacts to the sites that took a long time to heal.

Three National Parks along the Delaware and New Rivers in the eastern United States were examined (Cole, 1989) for impacts to vegetation and soils. Studies that had been conducted in western and northern Minnesota wilderness areas indicated that impacts to sites occurred rapidly even with light use levels. These impacts required a long healing period. The western environments were dry, harsh, characterized by infertile soils, and had short growing seasons. This study wanted to determine if previous conclusions from the western and northern areas could be applied to eastern riparian forests, where growing conditions are more favorable. The same inventory techniques used in the western and northern wilderness areas were used to sample the National Park lands. These eastern sites have long growing seasons, fertile soils, and lack of soil moisture is not a concern. Each sampled site had an undisturbed site measured for comparison. Results of the study indicated that impacts were similar for the eastern and western areas. The most critical management concern for all areas is limiting the size of the camp area; keep its boundaries from spreading. Individual campsites tend to become larger as use levels increase and environmental conditions allow for easy and unrestricted expansion. The Delaware Water Gap Park has adopted a policy that allows camping at designated campsites only, trying to limit and control recreational camping impacts.

The February 1993 publication of Forestry Research West had an abstract about a new research paper (Cole and Hall) discussing trends in wilderness campsites. Three wilderness areas that are located in different parts of the country with different campsite conditions had been studied for restoration possibilities. Both lightly and heavily impacted campsites were monitored over an eleven year period. The authors observed that heavily impacted sites tended to deteriorate more slowly with additional visitor use. Usually the impact was an expansion of the campsite perimeter. Site closures did little to improve the resource conditions, improvements were slow or the site continued to deteriorate after closure. An exception was those areas with deep productive soils and good amounts of rainfall. Campsites in these areas were able to recover from heavy recreational impacts after areas were closed to the public. Recommendations resulting from the study were to keep campsites open in areas of heavy visitor use if possible, and manage the sites to keep them from expanding in size. Have rules and constraints to keep party sizes small. Managers should concentrate restoration efforts on lightly impacted sites where management actions will have more of an effect. Use educational materials to try and prevent lightly impacted sites from becoming heavily impacted.

STANISLAUS LAND AND RESOURCE MANAGEMENT PLAN DIRECTION

The Stanislaus National Forest is in the Sierra Nevada mountain range of central California. The Forest is a three to four hour drive from the San Jose and San Francisco areas. The major cities of the San Joaquin Valley are 2-1/2 or less hours driving time away. The Stanislaus National Forest receives numerous visitors each year who have varying outdoor recreation expectations.

The Stanislaus Land and Resource Management Plan (the Plan) provides the general direction for managing the land and resources within the Stanislaus National Forest boundaries. The final draft of the Plan was finished in 1990 and then accepted in October 1991. The Plan identifies current opportunities and uses of the Forest and compares the projected future demands with expected supplies. Direction is included in the Plan for the management of the Forest using the developed Standards and Guidelines. There are minimum requirements for evaluating the conditions of the Forest resources and monitoring the results of management actions.

The Plan projects that recreation use on the Forest will increase 51% by the year 2000. Population projections for the State of California are expected to increase an average of 41%, and the populations of the local and surrounding central Sierra Nevada counties are expected to increase 100% by the year 2000. The Stanislaus had 2.2 million recreation visitor days (RVD's) in 1989 and this is expected to increase. One RVD equates to 12 hours of recreational use of Forest resources by one or more visitors. Developed campgrounds are at or over capacity during many of the summer weekends and holiday periods. In the monitoring section of the Plan, whenever developed recreation sites are being used at 40% of their theoretical capacity, new facilities should be planned for or management practices adjusted. Very little new campground construction is underway and developed recreation camping supply is not projected to keep pace with demand. This lack of developed recreation supply will place increased demands on dispersed recreation opportunities with more camping impacts possible.

Dispersed Motorized Recreation, which includes dispersed camping, is expected to increase along with developed recreation. Records indicated that 41% of the total Forest recreation was attributed to dispersed recreation activities (this did not include wilderness use) in 1989. Dispersed camping was 35% of the total dispersed recreation, or 377,700 RVD's. This percentage of dispersed camping is expected to increase, especially with developed campgrounds frequently at capacity during busy periods. This Plan projects that the Forest can meet the demand for increased dispersed recreation and camping through and beyond the year 2040.

Most non-wilderness dispersed camping occurs adjacent to or very near roads. People seek favorable campsite access for their motor homes, recreational vehicles and automobiles. Most of the roads in the Forest were built to provide access for timber harvesting activities. As logging continues and new access roads are built, there will be new dispersed camping opportunities. Road maintenance activities will improve, and open to public use, some existing roads that were neglected and became impassable. One potential problem with increasing, and improving the existing, dispersed camping opportunities is that these areas will not have the proper sanitation and vehicular controls necessary to protect the resources from the amount of use the campsites might receive.

According to the Plan, dispersed camping will be managed by the guidelines in the Recreation Opportunity Spectrum (ROS) classification system. This is a system that was developed to define the types of outdoor recreation opportunities visitors might want to experience or expect, and then identify which portions of the ROS spectrum a forest can provide. The Stanislaus Forest has the Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, and Rural classifications. Appendix H has a list of the ROS classifications and their definitions. Within this system, most dispersed camping occurs in the Roaded Natural classification. As further developments continue on the Forest, acres from other ROS land classifications will be switched to the Roaded Natural and Rural classifications and allow for more dispersed camping opportunities. The following chart from the Plan shows the projected ROS acreage shifts related to dispersed recreation and camping.

DISPERSED RECREATION SUPPLY

ROS	Acres	<u>Existing</u>		<u>Potential (2040)</u>		
		PAOT	RVD's	Acres	PAOT	RVD's
Primitive	153,525	1,228	91.1	160,630	1,606	192.7
Semi-Primitive, Non-motorized	225,472	2,255	102.0	183,970	2,760	993.6
Semi-primitive, Motorized	65,000	650	36.1	-	-	-
Roaded Natural/ Rural	448,728	35,898	502.3	541,749	54,174	3,900.5

PAOT = People At One Time, RVD = Recreation Visitor Day

Fifty percent of recreational activities occur in or are closely associated with water and riparian areas. Riparian areas are

defined as the transition zones between aquatic and terrestrial ecosystems. Vegetation in these zones requires large amounts of water to survive and thrive. Riparian areas are especially important for fish, some wildlife species, and certain vegetation communities. These areas influence water quality, visual and recreational enjoyment, timber production, forage production and cultural resources. The Stanislaus has 3.7% of its total land base classified as riparian. This illustrates the need to protect riparian zones and that recreational uses are likely to be concentrated in or near riparian zones.

Dispersed camping can have significant and detrimental impacts on soils. High use levels and vehicular traffic, especially if left uncontrolled in large and spacious areas, can cause compaction and loss of organic horizons. Compacted soils can cause increased stress to the growth and survival of vegetation. Increased runoff can cause erosion and gulying, ponding of water, and creation of muddy areas. Roads are widened by visitors driving around these muddy sites. Ruts in the roads become deeper, causing some roads to become impassable.

The Stanislaus National Forest goals for dispersed recreation and camping, that are not located in designated wilderness areas, are to manage these areas for recreational visitors while protecting the other resources. Normal operation and maintenance activities are to discourage concentrations of dispersed camping in sensitive areas such as meadows, riparian areas, old-growth timber, identified threatened and endangered wildlife areas, vegetation areas, and areas with known or suspected soil concerns. Dispersed camping special use permits that are issued need to address the concerns mentioned above and instruct permittees how to manage human waste, trash and amount of use.

Mentioned earlier was the need for dispersed camping to be managed within the ROS classification system. Appendix H has definitions of the ROS classes and appendix J has a chart displaying the level of facility development to be allowed in each classification. Areas in the Roaded Natural classification are to be managed so there is moderate evidence of the sights and sounds of other users. Interaction between users is supposed to be low to moderate. No extensive facilities are to be constructed and short stays should be encouraged.

There are several other management areas of the Plan where dispersed camping occurs. The Standards and Guidelines for dispersed camping are similar between management areas. In the Scenic and River Area, all facilities and improvements must be at least 100 feet away from the river, and screened from view of the river when possible. For the Near Natural Area, dispersed camping should only be allowed where it can blend in with the surrounding natural environment. Visitor information and education maps and

brochures should be developed and posted on information boards that stress acceptable dispersed camping practices. Within the Wildlife, Special Interest, Experimental Forest, and Scenic Corridors Areas; dispersed camping should have minimum facility developments and encourage short visits. In the Wildlife Area, seasonal closures for specific areas might be necessary to protect some wildlife species and special habitat areas. Inside the boundaries of The Experimental Forest Areas, no soil or vegetation impacts should be permitted that could impact existing or future studies. In Research Natural Areas, no dispersed camping should be allowed. Impacts from dispersed camping might adversely and permanently impact educational or research values in these Research Natural Areas.

The Plan has an evaluation and monitoring schedule for dispersed camping. Dispersed campsites are scheduled to be monitored every five years. This implies that locations of dispersed campsites need to be known and documented. The evaluations and monitorings should have the ability to identify sites receiving unacceptable high use levels or resource damage. The need to change visitor use habits or patterns should be indicated by the results of the evaluations and monitoring. Methods to accomplish the evaluations are occupancy rate samples (if available), and field observations of use and impacts resulting from dispersed camping activities. The Frissell campsite condition classification system, which rates campsite conditions by comparing them to five narratives, should be used to rate impacts at dispersed camping sites. No sites should be allowed that are in the class 4 or 5 condition. See Appendix E for the 5 Frissell condition class systems.

DEVELOPING A CAMPSITE INVENTORY FORM

The need for a methodology to inventory and evaluate dispersed camping impacts has been identified earlier in this paper. The data collection forms need to be easy for field personnel to use and able to provide consistent results when used by different sampling personnel over different time periods. Documenting the inventory results can help illustrate the need for funding and manpower. Display of results can help identify management priorities to address dispersed camping impacts.

An inventory form is needed to evaluate individual campsite conditions. These campsites should be evaluated and monitored for impacts to the resources. The locations of both individual and total campsites within an area are needed so they can be documented and monitored for improving or decreasing resource conditions. After a predetermined area is fully inventoried for dispersed campsites, an analysis of the results can indicate if impacts are widespread, if there are common characteristics between sites or impacts, and if the resource impacts are concentrated in certain areas. The results can be displayed with charts, graphs, tables, or whatever method(s) is most appropriate.

After the results have been analyzed, the next decision is what type of management plan or strategy should be used to deal with the impacts. It may be decided to not deal with the impacts if there are higher priority needs for the limited dollars and manpower available. It's possible management will decide not to address something they don't consider to be a problem. Documentation and good display of results might provide the justification and awareness for future management actions in dispersed camping areas.

Management of identified dispersed camping impacts should be started in a timely manner, or the expense of managing these impacts could be much greater in the future. Site closures could become necessary with the associated enforcement problems. This could create pressures on other areas, possibly creating new and worse resource impacts. Dispersed camping could begin occurring in areas with sensitive soils, riparian or other sensitive vegetation, special wildlife habitat, or locations too near water.

The Frissell wilderness campsite inventory method, suggested in the SLRMP for use in inventorying dispersed campsites, is a fast and fairly accurate technique. It does have limitations as described before in that it does not quantify impacts. The impacts resulting from dispersed camping can be different than the impacts that wilderness areas experience. Significant changes must occur to the campsite(s) before the changes will be reflected in a condition class change. A site may not meet all the criteria for one condition class narrative, it might have conditions that

meet two or more classes. No provisions are made with the Frissell method to identify which impacts should carry more weight in assigning condition class ratings to a campsite.

The development of this form was influenced by information from the literature search, the Stanislaus National Forest Land and Resource Management Plan, and input received from Forest specialists in water, soils, and wildlife. A rapid measurement and estimation technique was the method of inventory selected. This technique is fairly fast and allows the collection of data from a large number of sites with the limited dollars available, results are fairly accurate for the information collected, and some quantifiable data is collected that can help indicate if impacts are improving or getting worse over time.

Several rapid-estimation methods have been used in wilderness or park areas across the country. The Forest Service Wilderness Handbook has an example of a rapid estimation inventory form. These rapid estimation methods were studied for suggestions about impacts that could be used to inventory and evaluate dispersed camping activities. A new rapid estimation form was developed for inventorying dispersed campsites because the forms developed by researchers for use in wilderness areas did not fit all the needs of dispersed camping. Many impacts caused by dispersed camping can be traced to vehicles causing compaction or traveling in areas they should not be in. The dispersed camping being addressed by this report is usually associated with roads. Roads and vehicles are not part of the wilderness camping experience. Some of the impacts measured in wilderness areas such as social trails or litter present were too restrictive for dispersed camping areas. It was decided to incorporate the impacts and criteria used in wilderness areas that apply to dispersed camping, as being practiced on the Summit District, with additional impacts and criteria that were identified as necessary to measure into one form. The form is similar in appearance and several impacts to be measured are the same as those used in wilderness areas.

The impacts to be measured or estimated were selected based on the information from the literature review, the Stanislaus Land and Range Management Plan, and discussions with Stanislaus National Forest specialists. Vegetative cover and mineral soil losses were impacts that many of the rapid estimation techniques measured. Both impacts rated high in the Merigliano thesis study as indicators of resource deterioration to wilderness sites. Include only vegetation in this estimate; no trees, no seedlings, and only brush shorter than six feet. Estimate the percent of live vegetation cover present on the campsite and compare this to the percent of vegetative cover on a nearby undisturbed area. The difference in the two estimates is what determines the condition class rating. Estimate the percentage of exposed soil on the campsite and compare it to an undisturbed site. Again, the

difference in percentages will determine the condition class rating. Comparing the vegetation composition between the campsite and an undisturbed area will indicate if the species of plants are changing as a result of camping impacts. The distribution of vegetation is an indicator of camping impacts as islands of vegetation are only found in protected areas; behind trees, next to rocks, etc. Shrub damage is an estimate of the damage to shrubs at the campsite and nearby areas caused by camping practices. Off-site shrubs can be included in the estimate if the damage was a result of campers staying at the site. When shrubs were not part of the original site condition, use a rating of one. Tree damage is any nails, cuts, carvings, disfigurings, and removal of trees greater than two in inches diameter at ground level. Trees off the campsite but impacted by activities from the campsite can be counted. Trees with exposed roots can also be counted as damaged. Measure the distance to the nearest water from the center of the campsite. This impact is highly weighted as it is important to the streambank condition, riparian vegetation losses, pollution of the water, and campers want to camp as close to water as they can. The use in nights is based on field observations and visitor counts (visitor counts are not always done for dispersed camping areas). Determining the condition of the access road could be influenced by the time of year the data is collected. Look for evidence of past water flooding and rut problems, or ask others that have been in the area in the spring or early summer. Social paths are the trails or paths that are created by repetitive use from visitors and campers. Document under comments any pertinent information such as trail goes to water, toilet, etc. The trash and waste impacts are self-explanatory. Instead of feces pile, the inventory will probably find piles or scatterings of toilet paper. Determine how many other campsites can be seen from the center of the site? Do this campsite count during the day and not at night when campfires are burning and more easily visible. Camp area can be measured or paced out and recorded on the space provided and a condition class rating selected. Locate the campsite center as carefully as possible. The barren area is that part of the campsite that is down to bare mineral soil. This is usually the center of the site, around the campfire, and may include the tent placement and vehicle parking areas. Note in the comment section what is causing the bare area. Most dispersed campsites are without designated or obvious parking areas and bare areas seem to be expanding in size caused by the vehicular parking. These bare areas should be included in the total count of bare area. At the bottom of of the form on side two is space for comments. Write in anything that might help distinguish what is causing current impacts, or future concerns to monitor at the site.

Each impact has three condition class rating possibilities. Three classes were selected to cut down on the number of decisions and possible errors if too many classes were used. This number of

condition classes will provide accurate information and have been used in other wilderness inventory systems. Some of the impacts are rated by comparing disturbed sites with undisturbed sites. Other impacts are measured or estimated and assigned to the condition class that has the applicable range for that measurement. These ranges are similar to those used in the wilderness inventory systems identified in the literature search materials.

Each impact was assigned a weight of importance in relation to the other impacts. Impacts assigned the higher weights were those that could be measured with some degree of accuracy and had been identified as more important indicators of resource impacts in the literature search, the SLRMP, and discussions with specialists. A total cumulative impact rating index is determined by multiplying each impacts' condition class by the weight assigned that impact, and then totaling up all the weighted impacts. A range to rate the total cumulative impact index as low, medium, or high was developed. See appendix K for a table showing how the total impact index ranges were determined.

The other side of the inventory form is for descriptive information of the site and site location. The facilities present, distance to water, presence of and type of toilet, recreation activities possible, season of use, elevation, and ROS classification for the area is some of the information to be filled in. Room has been provided to draw a schematic map of the site or area location. There is also room at the bottom of the form for other specialists to write down any concerns they have with this dispersed camping site. It is important to include a review of dispersed campsites by specialists so they have an opportunity to identify possible concerns they might have with the dispersed campsite(s).

If results of the inventories indicate the need for more specific or detailed data for monitoring or evaluation of a campsite or area, then some campsites could have plots with permanent centers established to supplement the rapid estimation plots. The permanent plots would improve the consistency of results between the sampling time periods. Campsite and bare areas could be more accurately measured and re-measured to monitor changes. The other impacts listed on the form could also be more closely monitored for increasing or decreasing changes.

The following pages are the inventory form that was developed and associated instructions. For field use, the inventory form will be printed on both sides of one sheet one paper.

Dispersed Campsite Inventory and Evaluation Form (side one)

Date: _____ Watershed: _____
Recorder: _____ Location: T. ___, R. ___, S. ____
Site Number: _____ Elevation: _____
ROS Class: _____ Slope (%): _____
Nearest Road: Number/name _____, Distance _____

Check of the information most applicable to the site:

1. Road Access; System Road ___, Non-System Road _____.
Surface; Paved ___, Gravel ___, Dirt ____.
2. Nearest Water (within 200 feet); Lake ___, River ___, Stream ___, Meadow _____.
Presence of Water; Year round ___, Seasonal ____.
3. Number of Paths to Water; 1 ___, 2 ___, 3 ___, 4+ _____.
Average Path(s) Width in feet; <2 ___, 3 ___, 4 ___, >5 ____.
4. Riparian Vegetation Damage; None ___, 10% ___, 11-25% ___, >25% ____
(Compare to Undisturbed Area)
5. Season of Use; Spring ___, Summer ___, Fall ___, Winter ____.
6. Facilities Present; None ___, Rock Firering(#) ___, Stove ___, Other _____.
7. Toilet; None ___, Hole in ground ___, Pit ___, Vault ____.
8. Possible Activities At Site; Fishing ___, Swimming ___, Hiking ___,
Boating(manual) ___, Boating(power) ___, Picnicking ___,
Horse Riding ___, OHV Riding ___, Other _____.

Draw a sketch of map. Use landmarks and mileages when possible.

Specialist Reviews; Record Wildlife (TES), Water, Soil, etc. concerns.

Wildlife- _____.

Water- _____.

Engineering- _____.

Soils- _____.

Cultural- _____.

Timber- _____.

Other- _____.

Dispersed Campsite Inventory and Evaluation Form (side two)

Use the following ratings in questions #9 and #10:

1 = 0-10%, 2 = 11-25%, 3 = 26-50%, 4 = 51-75%, 5 = 76-100%

9. Vegetative Cover(circle one): On site = 1 2 3 4 5 , Off site = 1 2 3 4 5

10. Mineral Increase(circle one): On site = 1 2 3 4 5 , Off site = 1 2 3 4 5

Evaluation Criteria	Condition Class Rating (circle one)			Cond. Class	Weight Rating	Impact Rating
	1	2	3			
11. Vegetation loss	None	Difference of one Class Rating	>2 Class Diff.	X	3	=
12. Mineral increase	None	Difference of one Class Rating	>2 Class Diff.	X	3	=
13. Vegetation composition	Similar	Moderate	Significant Diff.	X	1	=
14. Vegetation distribut.	Similar	Islands & Protected	Protected	X	1	=
15. Shrub damagee	None	<30%	>30%	X	1	=
16. Tree damage#___	None	<2 trees	>2 trees	X	2	=
17. Distance to water___ft	>100 ft.	50-100 ft.	<50 ft.	X	3	=
18. Use in nights	0-2	2-5	>5	X	1	=
19. Access Road condition	No ruts, no Water	Minor ruts, Puddles	Major ruts, Rd. >1/2 Water	X	2	=
20. Social path(s)	1 path, <2 ft. wide	2 paths, 4 ft. wide	3+ paths, >5 ft. wide	X	1	=
21. Trash & waste	1 handful scattered trash, no feces piles	2 handfuls trash, one feces pile	>2 handfuls concentrated trash, 2+piles	X	2	=
22. Campsites in view	2	3-5	>5	X	1	=
23. Camp Area ____s.f.	<500 s.f.	500-2500 s.f.	>2500 s.f.	X	3	=
24. Barren Area ____s.f.	<50 s.f.	50-500 s.f.	>500 s.f.	X	3	=

low=27-39, medium=40-54, high=55-81

Cumulative Impact Rating = _____

Comments, suggestions: _____

FUNDING AND MANAGEMENT STRATEGY OPPORTUNITIES

Most employees in the Forest Service have heard there is no "new money". Other sources of funding need to be sought to try and maintain existing programs or start new ones. There's not much glamor in dispersed camping, so it will be a challenge to create interests in potential volunteers for helping volunteer with this program. Following are some suggestions for acquiring help to monitor dispersed camping activities:

Use of volunteers, individuals and groups (4WD clubs, Boy Scouts, etc.)

Look for funding from other Forest Service disciplines interested in doing restoration work to mitigate impacts to the affected resources.

Seek dollars from partners, state and local governments, local service organizations, etc.

If a timber sale area includes dispersed campsites within its boundaries, ask for dollars from the Knuston-Vandenberg (K-V) funding to properly close roads that were open for the timber sale, etc. Check with your timber preparation personnel or the FS manual on how to ask for K-V dollars and for what charges are appropriate.

Begin indicating the need for funding of dispersed camping activities when preparing budgets. Completed campsite inventories would be good indicators of funding needs and help to establish treatment priorities.

Some possible management strategies to mitigate resource impacts resulting from dispersed camping are:

Better informational signing. This could be posters, brochures, maps, or any combination that will get the message to visitors. These can be posted on information boards or handed out to the public. This information could be about encouraging the public to use proper dispersed camping practices, informing visitors of restricted activities and why they are restricted, explaining why site closures are necessary, etc. Generally, if the public is told why a management action is being practiced, they are more accepting of the action instead of becoming upset and continuing to do as they want or always have done in the past. Changes created by management activities need to be explained to visitors.

Barriers to control parking or site access. Prohibit or control the access to sensitive sites. Boulders work well and cannot be easily moved.

Surfacing access roads and parking areas with aggregate base or compacted native soils (if possible). This reduces erosion problems and helps designate the roads and parking areas better. Check with ROS to determine level of modification that is possible within an area.

Allow campfires in designated stoves only. This could eliminate the expanding network(s) of rock firerings. A flip-up type of stove is easy to clean. Again, check with ROS to determine what level of modifications are possible.

Locate toilets, built to SST standards, so they will be convenient to visitors and not located in sensitive areas. This will help to encourage campers and other visitors to use toilets instead of the bushes. Locate toilets where heavy traffic is not a problem.

Develop marketing strategies to direct visitors to less crowded sites or sites more resistant to dispersed camping impacts.

Provide explanatory signing on gates at closure points that explain the reasons for closure.

Limit the size of groups at sensitive sites.

Limit the number of nights camping is allowed in sensitive or heavy use sites.

Allow no campfires. Many campers want a campfire, and this type of restriction could encourage short stays or visitors might be decide to move to another area so they can have a campfire.

Convert dispersed camping areas into developed campgrounds with facilities and improvements designed to correct or mitigate resource impacts.

Allow dispersed camping in designated sites only. Several parks and wilderness areas have adopted this policy.

Site closure should be a last resort. Try to have acceptable alternative dispersed campsites available so impacts aren't introduced into more sensitive areas when areas are closed off.

RECOMMENDATIONS

Population and outdoor recreation trends are projected to continue increasing. The future supply of developed recreation camping opportunities are not expected to keep pace with future demands. This will put additional pressures on existing dispersed camping areas and cause the creation of new dispersed campsites by the visiting public. Managers need to address and monitor the impacts resulting from the recreational use of dispersed camping areas before these areas become more impacted and require substantial dollars and time to correct or mitigate. Site closures alone are not the answer, people will not go away but instead they will find other areas to camp at.

Surveys of dispersed campers are needed to determine their camping expectations. This could be difficult and time consuming since most dispersed campers don't have to sign in anywhere, they don't have to obtain permits, they are sometimes scattered over large areas, and generally seem to prefer being left alone.

Field surveys of dispersed camping sites should be started if not already being done. Select a survey method to include all sites within a geographic area, such as watersheds, compartments, or some other easy to track system. The distribution of campsites is as important as the individual campsite inventories. The form developed in this report on pages 21 and 22, one of the research forms mentioned in the literature search, or some other locally developed form could be used. The important thing is to begin documenting what is occurring in the field for future management decisions.

Practice using the selected form before going into the field and investing dollars and time in collecting data. The form must be easy to use, fairly quick, and accurate and precise enough for the desired end result. It is necessary to decide what information is important to collect and what will be done with the data after it is collected.

Utilize computers and data recorders during the field data collection and to help display the results. This will simplify the collection and storage of large amounts of data and cut down on mistakes. Good and informative displays can help convince managers of the problem and obtain funding to help address the recreational impacts.

Photographs should be considered to supplement the data collected on the field forms. Photos can help show changes that occur over time if care is taken to maintain consistency between photo time periods. Permanent points should be established to help maintain consistency between photo periods.

Locate or develop educational information about dispersed camping. This could be posters, brochures, or signing. Material specific to impacts resulting from dispersed camping activities is needed. The existing posters and brochures may not always address dispersed camping problems. An informed public is more likely to practice good camping habits than if left to guess on their own as to what are proper practices.

Consider using some of the suggestions in the section "Funding and Management Strategies" on pages 23 and 24, or brainstorm and come up with some other methods to deal with impacts and undesirable behavior associated with roaded dispersed camping.

More research is needed on the subject of roaded dispersed camping: what does the public expect or want, how should one measure impacts, which impacts should be measured. A number of research projects have dealt with wilderness camping impacts and some of this material can be used in roaded dispersed camping areas. More information is needed that is specific to roaded camping outside of developed campgrounds.

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APPENDIX

- A. Nine Evaluation Criteria from Merigliano's Thesis.
- B. Vegetative Impact Table from Merigliano's Thesis.
- C. Soil Impact Table from Merigliano's Thesis.
- D. Limits of Acceptable Change (LAC) Chart.
- E. Frissell Five Condition Classes.
- F. Sample Rapid Estimation Inventory Form with Eight Impact Criteria and Condition Ratings.
- G. Code-A-Site Dispersed Camping Forms.
- H. Recreation Opportunity Spectrum (ROS) Definitions.
- J. ROS Level of Modifications Chart.
- K. Cumulative Impact Range Computations for Dispersed Camping Form.
- L. Dispersed Camping Inventory Form Instructions.

CRITERIA FROM MERIGLIANO'S THESIS USED TO IDENTIFY
AND EVALUATE INDICATORS OF WILDERNESS IMPACTS

Long-term significance (significant)	-	The indicator detects a change in condition which cannot be reversed in five seasons with reasonable management effort.
Short-term significance (Sensitive)	-	The indicator detects a change in conditions which occurs within one season.
Responsive	-	The indicator detects a change in conditions which is potentially responsive to management control.
Detects amount	-	The indicator detects the amount of change in conditions.
Sensitive to wildness	-	The indicator detects a reduction in the area's ability to provide a wilderness experience (defined as a primitive and unconfined type of recreation or having outstanding opportunities for solitude).
Feasible	-	The indicator can be measured by field personnel using simple equipment and sampling techniques.
Reliable	-	With training, different observers will collect the same information.
Correlates with human use	-	The indicator detects a change in conditions which can be correlated with a specific type of human use.
Economical	-	The indicator produces information of acceptable accuracy which is worth the expense of measurement.

The first indicator, long-term significance, was eliminated from this list after responses from the panel of scientists were reviewed. A number of the panel members felt this criteria was confusing. Merigliano had originally suggested a 5 year period for this criteria, and many respondents felt no wilderness impacts should take 5 years to correct or be allowed to continue for 5 years. The Vegetative and Soil Impact Tables in this report's appendix have only eight criteria that the indicators are measured against as a result of this criteria being dropped.

PERFORMANCE OF INDICATORS TO MONITOR VEGETATION CONDITIONS IN WILDERNESS

	Short-Term significance	Responsive	Detects Amount	Sensitive to Wilderness	Feasible	Reliable	Correlates with human use	Economical	Overall Performance**
Number and distribution of campsites per area (28)*	Med.	High	High	High	High	High	Med.	High	679
Percent of ground cover loss on campsites (23)	Med.	High	High	Med.	High	High	Med.	Med.	667
Range condition and trend in grazed meadows (23)	Low	High	High	Low	High	High	High	High	638
Percent of total area disturbed by campsites (22)	Med.	High	High	Med.	High	High	Med.	Med.	619
Vegetation ground cover loss in trail corridors (28)	Low	High	High	Low	High	High	Med.	Med.	587
Exotic plant spp. distribution and density over entire area (14)	NS	Med.	Med.	NS	Med.	Med.	Doesn't meet	NS	392

* Number of scientists selecting indicator

High = 80-100% of the scientists responded YES, the indicator meets the criterion

Med. = 60-79% of the scientists responded YES, the indicator meets the criterion

Low = 40-59% of the scientists responded YES, the indicator meets the criterion

NS = there was not a significant difference between the proportion of scientists responding YES and the proportion that could have occurred just by chance.

Doesn't Meet = more than 50% of the scientists responded NO, the indicator does not meet the criterion

** Overall Performance is based on the cumulative percent of scientists responding YES, the indicator meets the criterion, added for the eight criteria (total possible = 800)

PERFORMANCE OF INDICATORS TO MONITOR SOIL CONDITIONS IN WILDERNESS

	Short-Term significance	Responsive	Detects Amount	Sensitive to Wilderness	Feasible	Reliable	Correlates with human use	Economical	Overall Performance**
Fire ring density (number/area) (23)*	High	High	High	Med.	High	High	Med.	Med.	667
Percent or area of exposed mineral soil on campsites (29)	Med.	High	High	Med.	High	High	Med.	Med.	627
Number of multiple trails in meadows or wet areas (14)	Med.	High	High	Med.	High	High	Med.	Med.	600
Cross-sectional area of net soil loss on trails (17)	Med.	High	High	NS	Med.	Med.	Low	Med.	548
Number of social trails (visitor created) associated with campsites (14)	Med.	Med.	Med.	Low	High	High	Med.	Low	544
Length of human trails per unit area (15)	Med.	High	High	NS	Med.	Med.	NS	NS	510
Percent of total area which is trailless (18)	Low	Med.	Med.	Med.	Med.	Med.	NS	Low	505

* Number of scientists selecting indicator

High = 80-100% of the scientists respond YES, the indicator meets the criterion

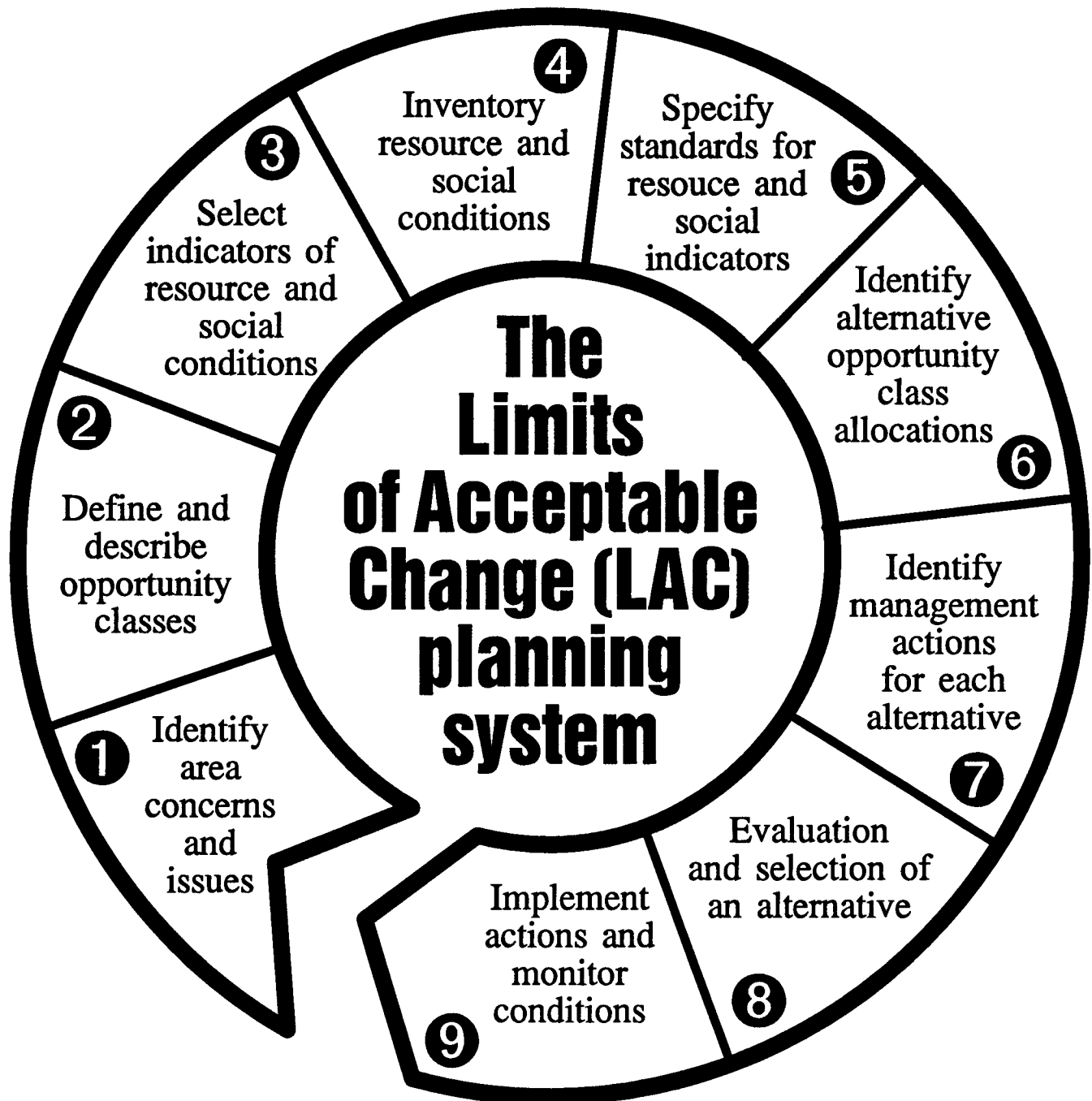
Med. = 60-79% of the scientists respond YES, the indicator meets the criterion

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Overall performance is based on the cumulative percent of scientists responding YES, the indicator meets the criterion, added for the eight criteria (total possible = 800)



FRISSELL'S CONDITION CLASS RATING FORM

<u>Condition class</u>	<u>Visible indicators</u>	<u>Management</u>
1	Ground vegetation flattened but not permanently injured. Minimal physical change except for possibly a simple rock fireplace.	These sites are barely recognizable as camping areas. If not in situations known to be sensitive to use (e.g., wet or slump areas), no management action is necessary. Maintain current use level or allow increase if nearby sites must be closed.
2	Ground vegetation worn away around fireplace or center of activity.	Site change now apparent but still within acceptable limits. These areas are readily identified as campsites and will continue to attract use. Future use should be carefully monitored to detect adverse change.
3	Ground vegetation lost on most of the site, but humus and litter still present in all but a few areas.	This is a transitional condition. Consideration change in plant cover is evident but little sign of soil problems. The condition may be accepted as normal in areas of high attraction. However, modification of current use patterns and intensities may be needed to prevent further change.
4	Bare mineral soil widespread. Tree roots exposed on the surface.	Deterioration is accelerating. If current level and type of use continues, soil erosion, loss of tree cover, and esthetic degradation are likely. Withdraw use from these sites and allow recovery. Some artificial rehabilitation may be desirable to speed recovery. If site is improperly located, permanent closure should be considered. If site is reopened, insure that use patterns are adjusted to prevent reinjury.
5	Soil erosion obvious. Trees reduced in vigor or dead.	Natural recovery will be extremely slow. The sites should be closed permanently and alternate ones located. If the site is critical to the recreation pattern, extensive rehabilitation will be required to return it to acceptable condition.

EIGHT IMPACT CRITERIA WITH CONDITION CLASS RATINGS
(For use with the 'Campsite Field Inventory Form')

Density of Vegetation

(with respect to surrounding vegetation):

- 1 - same as surroundings
- 3 - moderately less dense than surroundings
- 5 - considerably less dense than surroundings

Composition of Vegetation

(with respect to surrounding vegetation):

- 1 - same as surroundings
- 3 - moderately dissimilar
- 5 - significantly dissimilar

Total Area of Campsite

- 1 - less than or equal to 20 ft²
- 2 - 21 to 100ft²
- 3 - 101 to 500 ft²
- 4 - 501 to 1,000 ft²
- 5 - greater than 501 ft²

Campsite Development

- 1 - Windbreaks and paraphernalia absent; trash and seats minimal; firerings absent or scarce.
- 2 - Trash, windbreaks, seats, and firerings minimal; paraphernalia absent.
- 3 - Trash, windbreaks, seats mostly moderate; firerings mostly minimal, paraphernalia minimal.
- 4 - Trash, windbreaks, seats, firerings, and paraphernalia mostly moderate; some heavy.
- 5 - Trash, windbreaks, seats, firerings, paraphernalia mostly heavily developed.

Litter and Duff

- 1 - Trampling barely discernible; some needles broken, compacted; few cones.
- 2 - Moderately trampled; needles broken, compacted; few cones.
- 3 - heavily trampled, clumped, pulverized; cones absent.
- 4 - litter absent, pulverized, ground into soil.
- 5 - Litter, cones, and duff completely absent.

Social Trails

- 1 - None
- 2 - 1 trail discernible.
- 3 - 2 trails discernible.
- 4 - 1 to 2 trails well developed, or 3 or more trails discernible.
- 5 - 3+ trails well developed.

Mutilations

- 1 - None
- 2 - 1 to 2
- 3 - 3 to 5
- 4 - 6 to 10 or 1 or 2 highly obtrusive.
- 5 - 11+ or 3+ highly obtrusive.

CAMPSITE FIELD INVENTORY FORM

DATE _____

MANAGEMENT AREA _____ ZONE _____ ELEVATION _____

LANDFORM _____

CAPABILITY: Potential _____ Currently Used _____

OVERSTORY/COVER _____

MEADOWS _____ FUELS RATING _____

COMMENTS _____

Campsite Number (see map)	Campsite Class	Ecological Type		Campsite Potential	Distance to water	Crowding 3, 4, 5's	Comments
		Overstory	Understory				
1							
2							
3							
4							
5							
6							
7							
8							

APPLICATION OF RATING FACTORS FOR CAMPSITE CLASS DETERMINATION

Campsite #	1	2	3	4	5	6	7	8
Density								
Composition								
Total Area								
Barren Core								
Camp Development								
Litter and Duff								
Social Trails								
Mutilations								
Mean Rating or Campsite Class								

Example of a data collection form used to inventory campsites.

CHECK (X) APPROPRIATE CATEGORIES

PLEASE READ CODE BOOK PRIOR TO USING THIS CARD

CODE - A - SITE
(DISPERSED RECREATION SITE INVENTORY)
U S D A FOREST SERVICE
PACIFIC NORTHWEST FOREST & RANGE EXPERIMENT STATION
S-75 210923X MCBEER SYSTEMS SEATTLE, WA.

EXTRA CODING FOR LOCAL USE

DISPERSED
BACK COUNTRY
WILDERNESS
OTHER (SPECIFY →)

YEAR ROUND
SEASONAL (SPECIFY →)

MAIN ROAD
SPUR ROAD
INFORMAL ROAD
4 WHEEL DRIVE ROAD
OTHER (SPECIFY →)

MAIN TRAIL
SPUR TRAIL
PATH
CROSS COUNTRY
OTHER (SPECIFY →)

0 - 50'
51 - 100'
101 - 200'
OVER 200'

TURNOUT
TRAIL HEAD
ADJACENT ROAD
OTHER (SPECIFY →)

TENT SUITABILITY
← YES ☐ NO ☐ WHY? →

NO. OF TENT SPACES

VEHICLE SUITABILITY
← YES ☐ NO ☐ WHY? →

NO. OF VEHICLE SPACES

OFFICIAL
IMPROMPTU
UNIMPROVED
MINOR (SPECIFY →)
IMPROVEMENTS
MAJOR (SPECIFY →)
IMPROVEMENTS

0
1 - 3
4 - 5
6 +

0
1 - 3
4 - 5
6 +

NO. IN VIEW

NO. IN 1/4 MILE

OTHER SITES

VII SCHEMATIC DRAWING

USE BOX TO MAKE A ROUGH SKETCH OF SITE

INDICATE POSSIBLE TENT (X) AND VEHICLE (O) SPACES

INDICATE NORTH

II SITE RESOURCES

ON SITE
← YES ☐ NO ☐ WATER (SPECIFY LOCATION)

OFF SITE
← YES ☐ NO ☐ FIREWOOD (12) (SPECIFY LOCATION)

AVAIL. SOURCE AMOUNT

ABUNDANT AVAILABLE SCARCE NONE

ON SITE
← YES ☐ NO ☐ FORAGE (14) (SPECIFY TYPE & LOCATION)

OFF SITE
← YES ☐ NO ☐ OTHER RESOURCES (15) (SPECIFY IN COMMENTS SECTION)

ABUNDANT AVAILABLE SCARCE NONE

III AREA ATTRactions & OPPORTUNITIES (16)

FIREFOOD CUTTING
FISHING
BERRY PICKING
HUNTING
MUSHROOM COLLECTING
SCENERY
BRUSH PICKING
ROCK COLLECTING
HORSE LOADING
BOAT RAMP
OTHER

IV FACILITIES (19)

NO FACILITIES
GARBAGE CANS
INFORMATIONAL SIGNS
TABLES
FIREPLACE

TOILETS (18) (SPECIFY LOCATION) ←

NONE
PIT
PIT STRUCTURE
SEALED VAULT

OTHER FACILITIES (17) (SPECIFY)

1
2
3
4
5

Figure 1.--Front of a Code-A-Site inventory card.

RECREATION OPPORTUNITY SPECTRUM (ROS) DEFINITIONS

1. Primitive (P):

Areas managed to meet the ROS objective of Primitive, characterized by essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other area users is minimal. The area is managed to be essentially free from evidence of management restrictions and controls. Mechanized use is not permitted except where Forest Service approval authorizes entry.

2. Semi-primitive Nonmotorized (SPNM):

Areas managed to meet the ROS objective of Semi-primitive Nonmotorized, characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but they are subtle. Motorized vehicle use is not normally permitted. Outside of Wilderness, temporary vehicle use may be authorized based on special needs, but only for the duration of the project, and where roads are then obliterated. Examples of special needs are insect salvage, vehicle and equipment access supported by an escaped fire situation analysis, and placement or removal of facilities under Special Use Permit.

3. Semi-primitive Motorized (SPM):

Areas managed to meet the ROS objective of Semi-primitive motorized, characterized by a natural appearing environment of moderate to large size. Interaction between users is low to moderate and there is often evidence of other users. On-site controls and restrictions may be evident and motorized use is normally allowed.

4. Roaded Natural (RN):

Areas managed to meet the ROS objective of Roaded Natural, characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.

5. Rural (R)

Areas managed to meet the ROS objective of Rural, characterized by substantially modified natural environment. Resource modification and utilization practices are done primarily to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of man are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Facilities for intensified motorized use and parking are available.

FSM 2300 - RECREATION, WILDERNESS, AND RELATED RESOURCE MANAGEMENT

WO AMENDMENT 2300-90-1

EFFECTIVE 6/1/90

2330.3 - Exhibit 1

LEVEL OF SITE MODIFICATION		
Recreation opportunity spectrum class	Devel- opment scale	
Primitive	1	Minimum site modification. Rustic or rudimentary improvements designed for protection of the site rather than comfort of the users. Use of synthetic materials excluded. Minimum controls are subtle. No obvious regimentation. Spacing informal and extended to minimize contacts between users. Motorized access not provided or permitted.
Semi-primitive (Motorized and nonmotorized)	2	Little site modification. Rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of the users. Use of synthetic materials avoided. Minimum controls are subtle. Little obvious regimentation. Spacing informal and extended to minimize contacts between users. Motorized access provided or permitted. Primary access over primitive roads. Interpretive services informal, almost subliminal.
Roaded natural	3	Site modification moderate. Facilities about equal for protection of site and comfort of users. Contemporary/rustic design of improvements is usually based on use of native materials. Inconspicuous vehicular traffic controls usually provided. Roads may be hard surfaced and trails formalized. Development density about 3 family units per acre. Primary access may be over high standard roads. Interpretive services informal, but generally direct.
Rural	4	Site heavily modified. Some facilities designed strictly for comfort and convenience of users. Luxury facilities not provided. Facility design may incorporate synthetic materials. Extensive use of artificial surfacing of roads and trails. Vehicular traffic control usually obvious. Primary access usually over paved roads. Development density 3-5 family units per acre. Plant materials usually native. Interpretive services often formal or structured.
Urban	5	High degree of site modification. Facilities mostly designed for comfort and convenience of users and usually include flush toilets; may include showers, bathhouses, laundry facilities, and electrical hookups. Synthetic materials commonly used. Formal walks or surfaced trails. Regimentation of users is obvious. Access usually by high-speed highways. Development density 5 or more family units per acre. Plant materials may be foreign to the environment. Formal interpretive services usually available. Designs formalized and architecture may be contemporary. Mowed lawns and clipped shrubs not unusual.

Cumulative Impact Index Range Computations

This chart illustrates how ranges for the cumulative impact rating were developed for side tow of the Dispersed Campsite Inventory Form. The weights in column two are multiplied times the condition class ratings to get the numbers for columns three through seven. In the first column, all impacts are rated 1. In the second column, the impacts weighted 1 and 2 are given a ratings of 2 and 4 respectively. The third column rates all impacts 2. The fourth column rates impacts weighted 1 and 2 as 3 and 6 respectively. The final column has all impacts rated 3.

Evaluation Criteria #	Weight	Condition Class Ratings				
		1's	1&2's	2's	2&3's	3's
11.	3	3	3	6	6	9
12.	3	3	3	6	6	9
13.	1	1	2	2	3	3
14.	1	1	2	2	3	3
15.	1	1	2	2	3	3
16.	2	2	4	4	6	6
17.	3	3	3	6	6	9
18.	1	1	2	2	3	3
19.	2	2	4	4	6	6
20.	1	1	2	2	3	3
21.	2	2	4	4	6	6
22.	1	1	2	2	3	3
23.	3	3	3	6	6	9
24.	3	3	3	6	6	9
Total Ratings		27	39	54	66	81

LOW range equals a cumulative rating total between 27 and 39. Impacts are acceptable, record anything of note under comments that might warrant special attention later.

MEDIUM cumulative impact is range is 40 to 54. Impacts are still acceptable overall, but make note of any criteria that need immediate attention, especially at the upper end of the range.

HIGH impact range is 55 to 81. It's possible that most impacts are acceptable with two or more of the heavily weighted impacts rated threes. Or it could be that several impacts are not acceptable. Management actions are needed soon to correct the impacts before they become any worse.

Instructions for Completing Dispersed Camping Inventory Form

Side one:

Most of the requested information is self-explanatory. Most LMP's have the ROS classifications for their Forests. For the road information at the top, use the name or number of the road and measure from the campsite center to the road.

Sketch: Draw in sketch of campsite or area. Use known landmarks and mileages to help with relocating the site. Show campsite area and barren area, parking area, tent camping area, barrier location, shrubs or trees, toilet location, fire ring location, etc. Include any information that will be helpful in making management decisions or relocating the site.

Specialists reviews: This is a chance to learn of resource concerns that are not readily known to those doing the surveys. By involving other specialists now, problems can be avoided later. These specialists might have funding to help with future management activities.

Side two:

- #9. Determine the % of live vegetation cover at the campsite. Do not count trees, shrubs, duff, etc. Determine the % at an undisturbed area. Circle the appropriate rating for each.
- #10. Do the same as for #9.
- #11. Compare the two ratings to determine the Condition Class Rating.
- #12. Same as for #11.
- #13. Compare the vegetation composition (species present, amount present, etc.) to an undisturbed area to determine rating.
- #14. Do same as #13, compare campsite area to an undisturbed area.
- #15. Compare to similar undisturbed area to make estimate.
- #16. Damaged trees are those with nails in them, cuttings or scars, exposed roots, cut down trees, etc. A tree is defined as having a 2 inches diameter at the ground level.
- #17. Write down distance and select rating.
- #18. Use best information to answer.
- #19. What is condition of road. The $>1/2$ water is when water covers over $1/2$ of the road width.
- #20. Determine number and average width of social trails through the campsite.
- #21. Assign rating most applicable to site.
- #22. Determine number of other campsites within view. Do during day.
- #23. Measure widths, lengths, radii, or whatever to get area of campsite. This is that are impacted (trampled) by visitors to the site.
- #24. Take measurements to determine the area of the site that is down to bare mineral soil. This is usually near the center of the campsite where the fire ring is located.